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TITLE: Glutathione-S-conjugate transport in plants

Abstract Text (1):

The invention includes an isolated DNA encoding a plant GS-X pump polypeptide and an isolated preparation of a plant GS-X pump polypeptide. Also included is an isolated preparation of a nucleic acid which is antisense in orientation to a portion or all of a plant GS-X pump gene. The invention also includes a cells, vectors and transgenic plants having an isolated DNA encoding a plant GS-X pump and methods of use thereof. In addition, the invention relates to plant GS-X pump promoter sequences and the uses thereof.

Brief Summary Text (2):

Animal and plant cells have the capacity to eliminate a diversity of lipophilic toxins from the cytosol following conjugation of the toxin with glutathione (GSH) (Ishikawa et al., 1997, Bioscience Reports. 17:189-208; Martinoia et al., 1993, Nature 364:247-249; Li et al., 1995, Plant Physiol. 107:1257-1268). This process is mediated by the glutathione S-conjugate (GS-X) pumps which are novel MgATP-dependent transporters that catalyze the efflux of GS-conjugates and glutathione disulfide (GSSG) from the cytosol via the plasma membrane and/or endomembranes. GS-X pumps are considered to constitute a terminal phase of xenobiotic detoxification in animals and plants.

Brief Summary Text (4):

The GS-X pump is unique in its exclusive use of MgATP, rather than preformed transmembrane ion gradients, as a direct energy source for organic solute transport. Although an understanding of the constituents of GS-X pumps is relevant to an understanding of the mechanism by which cells combat, for example, chemotherapeutic agents and herbicides, there has until recently been a paucity of information on the molecular identity of GS-X pumps, particularly in plants.

Brief Summary Text (7):

ABC family members in eukaryotes include mammalian P-glycoproteins (P-gps or MDRs), some of which are implicated in drug resistance and others in lipid translocation (Ruetz et al., 1994, Cell 77:1071-1081), the pleiotropic drug resistance protein (PDR5) and STE6 peptide mating pheromone transporter of yeast, the cystic fibrosis transmembrane conductance regulator (CFTR) Cl_{sup}- channel, the malarial Plasmodium falciparum chloroquine transporter (PFMDR1) and the major histocompatibility (MHC) transporters responsible for peptide translocation and antigen presentation (Balzi et al., 1994, J Bioenerg. Biomemb. 27:71-76; Higgins, 1995, supra).

Brief Summary Text (9):

The invention described herein relates to bioremediation (specifically phytoremediation), plant responses to herbicides, plant-pathogen interactions and plant pigmentation.

that of organics and radionuclides combined (Nriagu et al., 1988, Nature 333:134-136).